

Ejercicios de Cálculo de Derivadas.

1. Calcula las derivadas de las funciones:

1. $f(x) = 5$
2. $f(x) = -2x$
3. $f(x) = -2x + 2$
4. $f(x) = -2x^2 - 5$
5. $f(x) = 2x^4 + x^3 - x^2 + 4$
6. $f(x) = \frac{x^3 + 2}{3}$
7. $f(x) = \frac{1}{3x^2}$
8. $f(x) = \frac{x + 1}{x - 1}$
9. $f(x) = (5x^2 - 3) \cdot (x^2 + x + 4)$
10. $f(x) = \frac{5}{x^5}$
11. $f(x) = \frac{5}{x^5} + \frac{3}{x^2}$
12. $f(x) = \sqrt{x}$
13. $f(x) = \frac{1}{\sqrt{x}}$
14. $f(x) = \frac{1}{x\sqrt{x}}$
15. $f(x) = \sqrt[3]{x^2} + \sqrt{x}$
16. $f(x) = (x^2 + 3x - 2)^4$
17. $f(x) = \sqrt{x^2 - 2x + 3}$
18. $f(x) = \sqrt[4]{x^5 - x^3 - 2}$
19. $f(x) = 10^{\sqrt{x}}$
20. $f(x) = e^{3-x^2}$
21. $f(x) = \frac{e^x + e^{-x}}{2}$
22. $f(x) = \frac{e^{2x}}{x^2}$
23. $f(x) = \ln(2x^4 - x^3 + 3x^2 - 3x)$

Soluciones

1. $f(x) = 5$
 $f'(x) = 0$
2. $f(x) = -2x$
 $f'(x) = -2$
3. $f(x) = -2x + 2$
 $f'(x) = -2$
4. $f(x) = -2x^2 - 5$
 $f'(x) = -4x$
5. $f(x) = 2x^4 + x^3 - x^2 + 4$
 $f'(x) = 8x^3 + 3x^2 - 2x$
6. $f(x) = \frac{x^3 + 2}{3}$
 $f'(x) = x^2$
7. $f(x) = \frac{1}{3x^2}$
 $f'(x) = \frac{-6x}{(3x^2)^2} = \frac{-6x}{9x^4} = -\frac{2}{3x^3}$
8. $f(x) = \frac{x+1}{x-1}$
 $f'(x) = \frac{1 \cdot (x-1) - (x+1) \cdot 1}{(x-1)^2} = \frac{-2}{(x-1)^2}$
9. $f(x) = (5x^2 - 3) \cdot (x^2 + x + 4)$
 $f'(x) = 10x(x^2 + x + 4) + (5x^2 - 3)(2x + 1) = 20x^3 + 15x^2 + 34x - 3$
10. $f(x) = \frac{5}{x^5} = 5x^{-5}$
 $f'(x) = -25x^{-6} = -\frac{25}{x^6}$
11. $f(x) = \frac{5}{x^5} + \frac{3}{x^2} = 5x^{-5} + 3x^{-2}$

$$f'(x) = -25x^{-6} - 6x^{-3} = -\frac{25}{x^6} - \frac{6}{x^3}$$

12. $f(x) = \sqrt{x} = x^{\frac{1}{2}}$

$$f'(x) = \frac{1}{2}x^{\frac{1}{2}-1} = \frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}}$$

13. $f(x) = \frac{1}{\sqrt{x}} = x^{-\frac{1}{2}}$

$$f'(x) = -\frac{1}{2}x^{-\frac{1}{2}-1} = -\frac{1}{2}x^{-\frac{3}{2}} = -\frac{1}{2\sqrt{x^3}}$$

14. $f(x) = \frac{1}{x\sqrt{x}} = \frac{1}{x \cdot x^{\frac{1}{2}}} = x^{-\frac{3}{2}}$

$$f'(x) = -\frac{3}{2}x^{-\frac{5}{2}} = -\frac{3}{2\sqrt{x^5}}$$

15. $f(x) = \sqrt[3]{x^2} + \sqrt{x} = x^{\frac{2}{3}} + x^{\frac{1}{2}}$

$$f'(x) = \frac{2}{3}x^{\frac{2}{3}-1} + \frac{1}{2}x^{\frac{1}{2}-1} = \frac{2}{3}x^{-\frac{1}{3}} + \frac{1}{2}x^{-\frac{1}{2}} = \frac{2}{3\sqrt[3]{x}} + \frac{1}{2\sqrt{x}}$$

16. $f(x) = (x^2 + 3x - 2)^4$

$$f'(x) = 4(x^2 + 3x - 2)^3 (2x + 3)$$

17. $f(x) = \sqrt{x^2 - 2x + 3}$

$$f'(x) = \frac{2x - 2}{2\sqrt{x^2 - 2x + 3}} = \frac{x - 1}{\sqrt{x^2 - 2x + 3}}$$

18. $f(x) = \sqrt[4]{x^5 - x^3 - 2}$

$$f'(x) = \frac{5x^4 - 3x^2}{4\sqrt[4]{(x^5 - x^3 - 2)^3}}$$

19. $f(x) = 10^{\sqrt{x}}$

20. $f(x) = e^{3-x^2}$

$$f'(x) = \frac{1}{2\sqrt{x}} \cdot 10^{\sqrt{x}} \cdot \ln 10$$

$$f'(x) = -2x \cdot e^{3-x^2}$$

21. $f(x) = \frac{e^x + e^{-x}}{2}$

$$f'(x) = \frac{e^x - e^{-x}}{2}$$

22. $f(x) = \frac{e^{2x}}{x^2}$

$$\begin{aligned} f'(x) &= \frac{2 \cdot e^{2x} \cdot x^2 - e^{2x} \cdot 2x}{x^4} = \frac{2x \cdot e^{2x} (x-1)}{x^4} = \\ &= \frac{2 \cdot e^{2x} (x-1)}{x^3} \end{aligned}$$

23. $f(x) = \ln(2x^4 - x^3 + 3x^2 - 3x)$

$$f'(x) = \frac{8x^3 - 3x^2 + 6x - 3}{2x^4 - x^3 + 3x^2 - 3x}$$

24.